

What is Claimed Is:

1. A method of manufacturing a patterned magnetic recording medium, comprising steps of:

(a) providing a non-magnetic substrate including at least one major surface;

5 (b) providing a stamper having a recess-patterned surface comprising a negative image of a pattern of recesses to be formed in said medium;

(c) forming a layer of a material having a first surface in conformal contact with said recess-patterned surface of said stamper and an exposed second surface opposite said first surface;

10 (d) placing said major surface of said substrate in contact with said exposed second surface of said layer of material; and

(e) removing said recess-patterned surface of said stamper from contact with said first surface of said layer of material;

15 whereby said layer of material is transferred to said major surface of said substrate, such that said second surface of said layer of material is in contact with said major surface of said substrate, and said first surface of said layer of material is exposed and includes a positive image of said pattern of recesses.

2. The method according to claim 1, wherein:

step (a) comprises providing a disk-shaped, high modulus substrate having a pair of major surfaces and comprised of a glass, ceramic, or glass-ceramic material.

3. The method according to claim 1, wherein:

step (b) comprises providing a stamper wherein at least said patterned surface is comprised of a metal, polymer, or carbon.

4. The method according to claim 1, wherein:

step (b) comprises providing a stamper having a recess-patterned surface comprising a negative image of a servo pattern to be formed in said magnetic recording medium.

5. The method according to claim 1, wherein:

step (c) comprises forming a layer of a partially dried sol-gel material in conformal contact with said recess-patterned surface of said stamper.

6. The method according to claim 5, wherein:

step (c) comprises forming a layer of a partially dried sol-gel material comprising a micro-porous structure of silica ( $\text{SiO}_2$ ) particles with solvents saturated in the micro-pores thereof.

7. The method according to claim 6, wherein:

step (c) comprises spin coating a layer of a  $\text{SiO}_2$ -containing sol solution on said recess-patterned surface of said stamper.

8. The method according to claim 6, wherein:

step (a) comprises providing a non-magnetic substrate wherein a spin-coated, partially dried layer of a sol-gel material comprising a micro-porous structure of silica ( $\text{SiO}_2$ ) particles with solvents saturated in the micro-pores thereof comprises said at least one major surface.

9. The method according to claim 6, further comprising the step of:

(f) converting said layer of partially dried sol-gel material to a glass or glass-like layer while preserving said pattern of recesses in said exposed first surface thereof.

10. The method according to claim 9, wherein:

step (f) comprises sintering said layer of partially dried sol-gel material at an elevated temperature.

11. The method according to claim 9, further comprising the step of:

(g) forming a laminate of thin film layers including in sequence: seed, underlayer, magnetic recording, protective overcoat, and lubricant topcoat layers over said exposed first surface of said glass or glass-like layer including said positive image of said pattern of recesses.

12. The method according to claim 1, wherein:

step (d) comprises urging said major surface of said substrate into contact with said second surface of said layer of material by application of pressure.

13. The method according to claim 1, wherein:

step (e) comprises separating said recess-patterned surface of said stamper from said first surface of said layer of material while maintaining said second surface of said layer of material in contact with said major surface of said substrate.

14. A structure for use in the manufacture of a patterned thin film magnetic recording medium, comprising:

a non-magnetic substrate including at least one major surface; and

a layer of a glass or glass-like material on said major surface of said substrate, said layer of glass or glass-like material including an exposed surface having a pattern of recesses formed therein by a process comprising steps of:

- (a) providing a non-magnetic substrate having a major surface;
- (b) providing a stamper having a recess-patterned surface comprising a negative image of said pattern of recesses to be formed in said medium;
- (c) forming a layer of a spin-coated, partially dried sol-gel material on said recess-patterned surface of said stamper, said layer comprising a micro-porous structure of silica ( $\text{SiO}_2$ ) particles with solvents saturated in the micro-pores

- 15                   thereof, said layer having a first surface in conformal  
                    contact with said recess-patterned surface of said stamper  
                    and an exposed second surface opposite said first surface;
- (d)    urging said major surface of said substrate into contact with  
                            said exposed second surface of said layer of partially dried  
20                   sol-gel material;
- (e)    removing said recess-patterned surface of said stamper  
                            from contact with said first surface of said layer of partially  
                            dried sol-gel material while leaving said second surface of  
                            said layer of partially dried sol-gel material in contact with  
25                   said major surface of said substrate, whereby said layer of  
                            partially dried sol-gel material is transferred to said major  
                            surface of said substrate, such that said first surface of said  
                            layer of partially dried sol-gel material is exposed and  
                            includes a positive image of said pattern of recesses; and
- 30                   (f)    converting said layer of partially dried sol-gel material to a  
                            glass or glass-like layer while preserving said pattern of  
                            recesses in said exposed first surface thereof.

15.    The structure as in claim 14, wherein said non-magnetic substrate comprises a disk-shaped, high modulus substrate having a pair of major surfaces and is comprised of a glass, ceramic, or glass-ceramic material.

16.    The structure as in claim 14, wherein said pattern of recesses in said exposed surface of said glass or glass-like layer forms a servo pattern for said magnetic recording medium.

17.    The structure as in claim 16, wherein said recesses are from about 1 to about 500 nm deep, from about .001 to about 1  $\mu\text{m}$  wide, and adjacent recesses are spaced apart at least about .001  $\mu\text{m}$ .

18. A servo-patterned magnetic recording medium, comprising the structure as in claim 17 and a laminate of thin film layers formed thereover, said laminate including seed, underlayer, magnetic recording, protective overcoat, and lubricant topcoat layers sequentially formed over said exposed first surface of said  
5 glass or glass-like layer including said positive image of said servo pattern formed therein.

19. A magnetic recording medium, comprising:  
a non-magnetic substrate having a surface; and  
sol-gel-based or derived means for providing a servo pattern which precisely replicates a master servo pattern formed in a surface of a stamper.

20. The magnetic recording medium as in claim 19, wherein:  
said sol-gel-based or derived means comprises a glass or glass-like layer on said surface of said non-magnetic substrate.